Overview

Useful For

Aiding in the distinction between a reactive cytosis and a myeloproliferative neoplasm

Testing Algorithm

The following algorithms are available in Special Instructions:

Myeloproliferative Neoplasm: A Diagnostic Approach to Bone Marrow Evaluation

Myeloproliferative Neoplasm: A Diagnostic Approach to Peripheral Blood Evaluation

Special Instructions

- Myeloproliferative Neoplasm: A Diagnostic Approach to Peripheral Blood Evaluation
- Myeloproliferative Neoplasm: A Diagnostic Approach to Bone Marrow Evaluation
- Hematopathology Patient Information

Method Name

Mutation Detection in DNA using Sanger Sequencing

NY State Available

Yes

Specimen

Specimen Type

Varies

Specimen Required

Submit only 1 of the following specimens:

Specimen Type: Peripheral blood

Container/Tube: Lavender top (EDTA) or yellow top (ACD)

Specimen Volume: 3 mL

Collections Instructions:

1. Invert several times to mix blood.

2. Send specimen in original tube.

3. Label specimen as blood.

Specimen Stability: Ambient (preferred)/Refrigerate

Specimen Type: Bone marrow

Container/Tube: Lavender top (EDTA) or yellow top (ACD)

Specimen Volume: 2 mL

Collections Instructions:

1. Invert several times to mix bone marrow.

2. Send specimens in original tube.

3. Label specimen as bone marrow.

Specimen Stability: Ambient (preferred)/Refrigerate

Specimen Type: Extracted DNA from blood or bone marrow

Container/Tube: 1.5- to 2- mL tube

Specimen Volume: Entire specimen

Collection Instructions: Label specimen as extracted DNA from blood or bone marrow and provide indication of volume and concentration of DNA.

Specimen Stability Information: Frozen (preferred)/Refrigerated/Ambient

Forms

1. Hematopathology Patient Information (T676) in Special Instructions

2. If not ordering electronically, complete, print, and send a Hematopathology/Cytogenetics Test Request (T726) with the specimen.

Specimen Minimum Volume

Blood, Bone Marrow: 1 mL
Extracted DNA: 50 mcL at 20 ng/mcL concentration

Reject Due To

Gross hemolysis	Reject
Other	Bone marrow biopsies, slides, paraffin shavings, moderately to severely clotted

Specimen Stability Information

Specimen Type	Temperature	Time	Special Container
Varies	Varies	7 days	

Clinical and Interpretive

Clinical Information

DNA sequence mutations in exon 10 of the myeloproliferative leukemia virus oncogene (*MPL*) have been detected in approximately 5% of patients with primary myelofibrosis (PMF) and essential thrombocythemia (ET), which are hematopoietic neoplasms classified within the broad category of myeloproliferative neoplasms. *MPL* codes for a transmembrane tyrosine kinase and the most common *MPL* mutations are single base pair substitutions at codon 515. These mutations have been shown to promote constitutive, cytokine-independent activation of the JAK/STAT signaling pathway and contribute to the oncogenic phenotype. At least 8 different *MPL* exon 10 mutations have been identified in PMF and ET to date, and mutations outside of exon 10 have not yet been reported. The vast majority of *MPL* mutations have been found in specimens testing negative for the most common mutation identified in myeloproliferative neoplasms, *JAK2* V716F, although a small number of cases with both types of mutations have been reported. *MPL* mutations have not been identified in patients with polycythemia vera, chronic myelogenous leukemia, or other myeloid neoplasms.

Identification of *MPL* mutations can aid in the diagnosis of a myeloproliferative neoplasm and is highly suggestive of either PMF or ET.

Reference Values

An interpretive report will be provided.

Interpretation

The results will be reported as 1 of 2 states:

-Negative for *MPL* exon 10 mutation

-Positive for *MPL* exon 10 mutation

If the result is positive, a description of the mutation at the nucleotide level and the altered protein sequence is reported.

Positive mutation status is highly suggestive of a myeloproliferative neoplasm, but must be correlated with clinical and other laboratory features for a definitive diagnosis. Negative mutation status does not exclude the presence of a myeloproliferative or other neoplasm.

Cautions

A positive result is not specific for a particular diagnosis and clinicopathologic correlation is necessary in all cases.

A negative result does not exclude the presence of a myeloproliferative or other neoplasm.

Supportive Data

Analytical sensitivity is approximately 20%, meaning there must be about 20% of the mutated DNA in the specimen for reliable detection.

Clinical Reference

1. Defour JP, Chachoua I, Pecquet C, Constantinescu SN: Oncogenic activation of MPL/thrombopoietin receptor by 17 mutations at W515: implications for myeloproliferative neoplasms. Leukemia 2016; 30:1214-1216. doi: 10.1038/leu.2015.271

2. Pikman Y, Lee BH, Mercher T, et al: MPLW515L is a novel somatic activating mutation in myelofibrosis with myeloid metaplasia. PLoS Med 2006;3:e270

3. Pardanani A, Levine R, Lasho T, et al: MPL515 mutations in myeloproliferative and other myeloid disorders: a

study of 1182 patients. Blood 2006;15:3472-3476

4. Kilpivaara O, Levine RL: JAK2 and MPL mutations in myeloproliferative neoplasms: discovery and science. Leukemia 2008;22:1813-1817. doi: 10.1038/leu.2008.229

Performance

Method Description

Genomic DNA is extracted from the blood or bone marrow sample and the *MPL* exon 10 amplified using standard PCR. The entire exon 10 sequence is obtained using Sanger sequencing with analysis on an automated genetic analyzer.(Unpublished Mayo method)

PDF Report

No

Day(s) and Time(s) Test Performed

Monday through Friday

Analytic Time

5 days

Maximum Laboratory Time

8 days

Specimen Retention Time

DNA: 3 months

Performing Laboratory Location

Rochester

Fees and Codes

Fees

- Authorized users can sign in to Test Prices for detailed fee information.
- Clients without access to Test Prices can contact Customer Service 24 hours a day, seven days a week.
- Prospective clients should contact their Regional Manager. For assistance, contact Customer Service.

Test Classification

This test was developed and its performance characteristics determined by Mayo Clinic in a manner consistent with CLIA requirements. This test has not been cleared or approved by the U.S. Food and Drug Administration.

CPT Code Information

81403-*MPL* (myeloproliferative leukemia virus oncogene, thrombopoietin receptor, TPOR) (eg, myeloproliferative disorder), exon 10 sequence

LOINC® Information

Test ID	Test Order Name	Order LOINC Value
MPLVS	MPL Exon 10 Mutation Detection, V	62948-5

Result ID	Test Result Name	Result LOINC Value
MP051	Specimen Type	31208-2
602600	Interpretation	69047-9
602601	Signing Pathologist	19139-5